SEQUENCE LISTING BOLDER INGELHEIM (CANADA) LTD. <120> SELF REPLICATING RNA MOLECULE FROM **HEPATITIS C VIRUS** <130> 13/083-2-C1 <140> 10/686,835 <141> 2003-10-16 <150> 10/029,907 <151> 2001-12-21 <150> 60/257,857 <151> 2000-12-22 <160> 28 <170> FastSEQ for Windows Version 4.0 <210> 1 <211> 8639 <212> DNA <213> HCV <220> <221> CDS <222> (1803)...(8408) ggccagcccc cgattggggg cgacactcca ccatagatca ctcccctgtg aggaactact 60 gtcttcacgc agaaagcgtc tagccatggc gttagtatga gtgtcgtgca gcctccagga 120 gtcttcacgc agaaagcgtc tagccatggc gttagtatga gtgtcgtgca gcctccagga 120 cccccctcc cgggagagcc atagtggtct gcggaaccgg tgagtacacc ggaattgcca 180 ggacgaccgg gtcctttctt ggatcaaccc gctcaatgcc tggagatttg ggcgtgcccc 240 cgcgagactg ctagccgagt agtgttgggt cgcgaaaggc cttgtggtac tgcctgatag 300 ggtgcttgcg agtgccccgg gaggtctcgt agaccgtgca ccatgagcac gaatcctaaa 360 cctcaaagaa aaaccaaagg gcgcgccatg attgaacaag atggattgca cgcaggttct 420 ccggccgctt gggtggagag gctattcggc tatgactggg cacaacagac aatcggctgc 480 tctgatgccg ccgtgttccg gctgtcagcg caggggcgcc cggttcttt tgcaagacc 540 gacctgtccg gtgccctgaa tgaactgcag gacgaggcag cgcggctatc gtggctggcc 600 acgacgggcg ttccttgcgc agctgtgctc gacgttgtca ctgaagcggg aagggactgg 660 ctgctattgg gcgaagtgcc ggggcaggat ctccttgcc agcggaagtgcc ccctattaccttgc tcctqccaa 720 acgacgggcg treettgcgc agetgtctc gacgttgtca ctgaageggg aagggactgg 660 ctgctattgg gegaagtgcc ggggcaggat ctcctgtcat ctcaccttgc tectgccgag 720 aaagtatcca tcatggctga tgcaatgegg eggetgcata egettgatee ggctacetge 780 ctattegace accaagegaa acategeate gagegageae gtaeteggat ggaageeggt 840 cttgtegate aggatgatet ggaegaagag cateagggge tegegeeage egaactgtte 900 gecaggetea aggegegeat gecegaegge gaggateteg tegtgaeeaa tggegatgee 960 tgcttgeega atateatggt ggaaaatgge egetttettg gatteatega etgtggeegg 1020 ctgggtgtgg eggaeegeta teaggaeata gegttggeta eeegtgatat tgetgaagag 1080 cttggeggeg aatgggetga eegetteete gtgettaeeg gtategeege teeegatteg 1140 cagegeateg eettetaeeg eettetteeg eagtteteet gagttegee eeagaegta 1200 acagaeeaca acggtteee teetagggga teaatteege eeestaetg 1260

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gcc caa (Ala Gln (1010	Leu Āla	cct ccc Pro Pro	agc Ser 101	Ala	gct Ala	tct Ser	gct Ala	ttc Phe 1020	Val	ggc Gly	gcc Ala	ggc Gly	4873
atc gct of the state of the sta	gga gcg Gly Ala	gct gtt Ala Va 103	Gly	agc Ser	ata Ile	ggc Gly	ctt Leu 1035	GIY	aag Lys	gtg val	ctt Leu	gtg Val 1040	4921
gat att Asp Ile	ttg gca Leu Ala	ggt tat Gly Tyi 1045	gga Gly	gca Ala	ggg Gly	gtg Val 1050	gca Ala)	ggc Gly	gcg Ala	ctc Leu	gtg Val 105!	gcc Ala	4969
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tgc gca (Cys Ala / 1090	gcg ata Ala Ile	ctg cg	cgg Arg 109	cac His	gtg val	ggc Gly	cca Pro	ggg Gly 1100	gag Glu)	ggg Gly	gct Ala	gtg Val	5113
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tcc ccc s	acg cac Thr His	tat gtg Tyr Va 1125	cct Pro	gag Glu	agc Ser	gac Asp 1130	Ala	gca Ala	gca Ala	cgt Arg	gtc Val 113	ınr	5209
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20

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Thr Lys Tyr Ile Met Ala Cys Met Ser Ala Asp Leu Glu Val Val Thr Ser Thr Trp Val Leu Val Gly Gly Val Leu Ala Ala Leu Ala Ala Tyr 850 855 860 Cys Leu Thr Thr Gly Ser Val Val Ile Val Gly Arg Ile Ile Leu Ser 865 870 875 _ 880 Gly Xaa Pro Ala Ile Ile Pro Asp Arg Glu Val Leu Tyr Arg Glu Phe Asp Glu Met Glu Glu Cys Ala Ser His Leu Pro Tyr Ile Glu Gln Gly Met Gln Leu Ala Glu Gln Phe Lys Gln Lys Ala Ile Gly Leu Leu Gln 915 920 925 Thr Ala Thr Lys Gln Ala Glu Ala Ala Ala Pro Val Val Glu Ser Lys Trp Arg Thr Leu Glu Ala Phe Trp Ala Lys His Met Trp Asn Phe Ile Ser Gly Ile Gln Tyr Leu Ala Gly Leu Ser Thr Leu Pro Gly Asn Pro Ala Ile Ala Ser Leu Met Ala Phe Thr Ala Ser Ile Thr Ser Pro Leu Ala Gln Leu Ala Pro Pro Ser Ala Ala Ser Ala Phe Val Gly Ala Gly Ile Ala Gly Ala Ala Val Gly Ser Ile Gly Leu Gly Lys Val Leu Val Asp Ile Leu Ala Gly Tyr Gly Ala Gly Val Ala Gly Ala Leu Val Ala Phe Lys Val Met Ser Gly Glu Met Pro Ser Thr Glu Asp Leu Val Asn Leu Leu Pro Ala Ile Leu Ser Pro Gly Ala Leu Val Val Gly Val Val Cys Ala Ala Ile Leu Arg Arg His Val Gly Pro Gly Glu Gly Ala Val Gln Trp Met Asn Arg Leu Ile Ala Phe Ala Ser Arg Gly Asn His Val Ser Pro Thr His Tyr Val Pro Glu Ser Asp Ala Ala Ala Arg Val Thr Gln Ile Leu Ser Ser Leu Thr Ile Thr Gln Leu Leu Lys Arg Leu His 1140 1145 1150 Gln Trp Ile Asn Glu Asp Cys Ser Thr Pro Cys Ser Gly Ser Trp Leu Arg Asp Val Trp Asp Trp Ile Cys Thr Val Leu Thr Asp Phe Lys Thr 1170 1175 1180 Trp Leu Gln Ser Lys Leu Leu Pro Arg Leu Pro Gly Val Pro Phe Phe Ser Cys Gln Arg Gly Tyr Lys Gly Val Trp Arg Gly Asp Gly Ile Met 1205 1210 1215 Gln Thr Thr Cys Pro Cys Gly Ala Gln Ile Thr Gly His Val Lys Asn Cys Ser Met Arg Ile Val Gly Pro Arg Thr Cys Ser Asn Thr Trp His Gly Thr Phe Pro Ile Asn Ala Tyr Thr Thr Gly Pro Cys Thr Pro Ser Pro Ala Pro Asn Tyr Ser Arg Ala Leu Trp Arg Val Ala Ala Glu Glu 1265 1270 1275 1280 Tyr Val Glu Val Thr Arg Val Gly Asp Phe His Tyr Val Thr Gly Met Thr Thr Asp Asn Val Lys Cys Pro Cys Gln Val Pro Ala Pro Glu Phe 1300 1305 1310 Phe Thr Glu Val Asp Gly Val Arg Leu His Arg Tyr Ala Pro Ala Cys Lys Pro Leu Leu Arg Glu Glu Val Thr Phe Leu Val Gly Leu Asn Gln

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                    1910
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                1925
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Met Thr Arg Tyr Ser Ala Pro Pro Gly Asp Pro Pro Lys Pro Glu Tyr
1955 1960 1965
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                         1975
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                                      2010
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2020 2025 2030
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        2035
                             2040
                                                   2045
Leu Glu Lys Ala Leu Asp Cys Gln Ile Tyr Gly Ala Cys Tyr Ser Ile
                         2055
                                              2060
Glu Pro Leu Asp Leu Pro Gln Ile Ile Gln Arg Leu His Gly Leu Ser
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                     2070
2065
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2085 2090 2095
                                      2090
                 2085
Ser Cys Leu Arg Lys Leu Gly Val Pro Pro Leu Arg Val Trp Arg His 2100 2105 2110
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Arg Ala Arg Ser Val Arg Ala Arg Leu Leu Ser Gln Gly Gly Arg Ala 2115 _ 2120 _ 2125
Ala Thr Cys Gly Lys Tyr Leu Phe Asn Trp Ala Val Arg Thr Lys Leu
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Lys Leu Thr Pro Ile Pro Ala Ala Ser Gln Leu Asp Leu Ser Ser Trp
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2145
Phe Val Ala Gly Tyr Ser Gly Gly Asp Ile Tyr His Ser Leu Ser Arg 2165 2170 2175
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Gly Gly Pro Leu Thr Asn Ser Lys Gly Gln Asn Cys Gly Tyr Arg Arg

Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Cys Gly Asn Thr Leu Thr 1890 1895 1900

1880

1860

1875

1865

1870

1885

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4537

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1445	1450	1455

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1620 1625 1630	
1620 1625 1630	745
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1700 1705 1710

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atc cgc tcc g Ile Arg Ser V 1730	al Trp Lys As	ac ttg ctg ga sp Leu Leu Gl 735	a gac act gag u Asp Thr Glu 1740	aca cca att Thr Pro Ile	7033
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atg ggc ttc g Met Gly Phe A 1825	ca tat gac ac la Tyr Asp Th 1830	cc cgc tgt tt nr Arg Cys Ph	t gac tca acg e Asp Ser Thr 1835	gtc act gag Val Thr Glu 1840	7321
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Pro Ğlu Ala A	ga cag gcc at rg Gln Ala Il 860	a agg tcg ct le Arg Ser Le 1865	c aca gag cgg u Thr Glu Arg	ctt tac atc Leu Tyr Ile 1870	7417
ggg ggc ccc c Gly Gly Pro Lo 1875	tg act aat to eu Thr Asn Se	t aaa ggg ca er Lys Gly Gl 1880	g aac tgc ggc n Asn Cys Gly 1885	Tyr Arg Arg	7465
tgc cgc gcg a Cys Arg Ala S 1890	er Gly Val Le	g acg acc ag eu Thr Thr Se 195	c tgc ggt aat r Cys Gly Asn 1900	acc ctc aca Thr Leu Thr	7513
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atg act aga to Met Thr Arg T	ac tct gcc co yr Ser Ala Pi	c cct ggg ga ro Pro Gly As	c ccg ccc aaa p Pro Pro Lys 32	cca gaa tac Pro Glu Tyr	7705

1955	1960	1965

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gat gca tct ggc aaa agg gtg tac tat ctc acc cgt gac ccc acc ASP Ala Ser Gly Lys Arg Val Tyr Tyr Leu Thr Arg ASP Pro Thr Thr 1985 1990 1995 2000	7801
ccc ctt gcg cgg gct gcg tgg gag aca gct aga cac act cca gtc aat 7 Pro Leu Ala Arg Ala Ala Trp Glu Thr Ala Arg His Thr Pro Val Asn 2005 2010 2015	7849
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gca ttt tca ctc cat agt tac tct cca ggt gag atc aat agg gtg gct Ala Phe Ser Leu His Ser Tyr Ser Pro Gly Glu Ile Asn Arg Val Ala 2085 2090 2095	8089
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cgg gcc aga agt gtc cgc gct agg cta ctg tcc cag ggg ggg agg gct 8 Arg Ala Arg Ser Val Arg Ala Arg Leu Leu Ser Gln Gly Gly Arg Ala 2115 2120 2125	8185
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Leu Ile Leu Leu Thr Leu Ser Pro His Tyr Lys Leu Phe Leu Ala Arg
                                                                                                                                        1897
ctc ata tgg tgg tta caa tat ttt atc acc agg gcc gag gca cac ttg
Leu Ile Trp Trp Leu Gln Tyr Phe Ile Thr Arg Ala Glu Ala His Leu
35 40
                                                                                                                                        1945
caa gtg tgg atc ccc ccc ctc aac gtt cgg ggg ggc cgc gat gcc gtc
Gln Val Trp Ile Pro Pro Leu Asn Val Arg Gly Gly Arg Asp Ala Val
50 60
                                                                                                                                        1993
                                                                                                                                        2041
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Ile Leu Leu Thr Cys Ala Ile His Pro Glu Leu Ile Phe Thr Ile Thr
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                                                                                                                                        2089
                                                                                    34
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Lys	Ile	Leu	Leu	Ala 85	Ile	Leu	Gly	Pro	Leu 90	Met	٧a٦	Leu	Gln	Ala 95	Gly	
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ctc Leu	atg Met 130	aag Lys	ttg Leu	gcc Ala	gca Ala	ctg Leu 135	aca Thr	ggt Gly	acg Thr	tac Tyr	gtt Val 140	tat Tyr	gac Asp	cat His	ctc Leu	2233
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gca Ala	gtt val	gag Glu	ccc Pro	gtc Val 165	gtc Val	ttc Phe	tct Ser	gat Asp	atg Met 170	gag Glu	acc Thr	aag Lys	gtt Val	atc Ile 175	acc Thr	2329
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act Thr	gga Gly	gaa Glu	atc Ile	ccc Pro 565	ttt Phe	tat Tyr	ggc Gly	aaa Lys	gcc Ala 570	atc Ile	ccc Pro	atc Ile	gag Glu	acc Thr 575	atc Ile	3529
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Τı	gg rp 45	cgg Arg	acc Thr	ctc Leu	gaa Glu	gcc Ala 950	ttc Phe	tgg Trp	gcg Ala	aag Lys	cat His 955	atg Met	tgg Trp	aat Asn	ttc Phe	atc Ile 960	4681
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I	tc le 025	Ala	gga Gly	gcg Ala	gct Ala	gtt Val 1030	Gly	agc Ser	ata Ile	ggc Gly	ctt Leu 103	Gly	aag Lys	gtg Val	ctt Leu	gtg Val 1040	4921
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C1 Le	ta eu	ctc Leu	cct Pro 1075	Ăla	atc Ile	ctc Leu	tcc Ser	cct Pro 1080	Ğly	gcc Ala	cta Leu	gtc Val	gtc Val 108	Gly	gtc Val	gtg Val	5065
to Cy	gc ys	gca Ala 1090	Ala	ata Ile	ctg Leu	cgt Arg	cgg Arg 1095	His	gtg Val	ggc Gly	cca Pro	ggg Gly 1100	Glu	ggg Gly	gct Ala	gtg Val	5113
ca	ag	tgg	atg	aac	cgg	ctg	ata	gcg	ttc	gct	tcg 38	cgg	ggt	aac	cac	gtc	5161

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G]n 110	Тгр 5	Met	Asn	Arg	Leu 111(Ala	Phe	Ala	Ser 1115		Gly	Asn	ніѕ	Val 1120	
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Val Leu Thr Ser	Met Leu Thr 1365	Asp Pro Ser 137	His Ile Thr O	Ala Glu Thr 1375
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tca gct agc cag Ser Ala Ser Gln 1395	ctg tct gcg Leu Ser Ala	ccc tcc ttg Pro Ser Leu 1400	aag gca aca Lys Ala Thr 140	_Cys Thr Thr
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gaa gcc tgt Glu Ala Cys	aag ctg acg Lys Leu Thr 1700	ccc cca cat Pro Pro His 170	tcg gcc aga Ser Ala Arg S	tct aaa ttt Ser Lys Phe 1710	ggc 6937 Gly
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cct cag gcc Pro Gln Ala 1795	Val Met Gly	tct tca tac Ser Ser Tyr 1800	gga ttc caa Gly Phe Gln	tac tct cct Tyr Ser Pro 1805	gga 7225 Gly
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Asn Asp Ile	cgt gtt gag Arg Val Glu 1845	Glu Ser Ile	Tyr Gln Cys 1850	Cys Asp Leu 185	Ala
Asn Asp Ile	Arg Val Glu 1845 aga cag gcc	ata agg tcg	tyr Gin Cys 1850 ctc aca gag Leu Thr Glu	cgg ctt tac	atc 7417

Gly Gly Pro Leu Thr	Asn Ser Lys Gly Glr	Asn Cys Gly Tyr Arg Arg	
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tgc cgc gcg agc ggt	gta ctg acg acc ago	tgc ggt aat acc ctc aca	7513
Cys Arg Ala Ser Gly	Val Leu Thr Thr Ser	Cys Gly Asn Thr Leu Thr	
1890	1895	1900	
tgt tac ttg aag gcc	gct gcg gcc tgt cga	gct gcg aag ctc cag gac	75.61
Cys Tyr Leu Lys Ala	Ala Ala Ala Cys Arg	Ala Ala Lys Leu Gln Asp	
1905	1910	1915 1920	
tgc acg atg ctc gta Cys Thr Met Leu Val 1925	Cys Gly Asp Asp Leu	gtc gtt atc tgt gaa agc Val Val Ile Cys Glu Ser 1935	7609
gcg ggg acc caa gag	gac gag gcg agc cta	cgg gcc ttc acg gag gct	7657
Ala Gly Thr Gln Glu	Asp Glu Ala Ser Leu	Arg Ala Phe Thr Glu Ala	
1940	1945	1950	
atg act aga tac tct	gcc ccc cct ggg gad	ccg ccc aaa cca gaa tac	7705
Met Thr Arg Tyr Ser	Ala Pro Pro Gly Asp	Pro Pro Lys Pro Glu Tyr	
1955	1960	1965	
gac ttg gag ttg ata	aca tca tgc tcc tcc	aat gtg tca gtc gcg cac	7753
Asp Leu Glu Leu Ile	Thr Ser Cys Ser Ser	Asn Val Ser Val Ala His	
1970	1975	1980	
gat gca tct ggc aaa	agg gtg tac tat ctc	acc cgt gac ccc acc acc	7801
Asp Ala Ser Gly Lys	Arg Val Tyr Tyr Leu	Thr Arg Asp Pro Thr Thr	
1985	1990	1995 2000	
ccc ctt gcg cgg gct Pro Leu Ala Arg Ala 2009	Ala Trp Glu Thr Ala	aga cac act cca gtc aat Arg His Thr Pro Val Asn 0 2015	7849
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Ser Trp Leu Gly Asn	Ile Ile Met Tyr Ala	g Pro Thr Leu Trp Ala Arg	
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Met Ile Leu Met Thr	His Phe Phe Ser Ile	Leu Leu Ala Gln Glu Gln	
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ctt gaa aaa gcc cta	gat tgt cag atc tac	ggg gcc tgt tac tcc att	7993
Leu Glu Lys Ala Leu	Asp Cys Gln Ile Tyr	Gly Ala Cys Tyr Ser Ile	
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Glu Pro Leu Asp Leu	Pro Gln Ile Ile Glr	Arg Leu His Gly Leu Ser	
2065	2070	2075 2080	
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tca tgc ctc agg aaa	ctt ggg gta ccg ccc	ttg cga gtc tgg aga cat	8137
Ser Cys Leu Arg Lys	Leu Gly Val Pro Pro	Leu Arg Val Trp Arg His	
2100	2105	2110	
cgg gcc aga agt gtc	cgc gct agg cta ctg	g tcc cag ggg ggg agg gct	8185
Arg Ala Arg Ser Val	Arg Ala Arg Leu Lei	i Ser Gln Gly Gly Arg Ala	
2115	2120	2125	
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Lys Leu Thr Pro Ile Pro Ala Ala Ser Gln Leu Asp Leu Ser Ser Trp
                                                                                                                     8281
                                    2150
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Phe Val Ala Gly Tyr Ser Gly Gly Asp Ile Tyr His Ser Leu Ser Arg
                                                                                                                     8329
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Ala Arg Pro Arg Trp Phe Thr Trp Cys Leu Leu Leu Ser Val Gly
2180 2185 2190
                                                                                                                     8377
                                                                                                                     8427
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Val Gly Ile Tyr Leu Leu Pro Asn Arg
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                                                  2200
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acc Thr	caa G1n 290	atg Met	tac Tyr	acc Thr	aat Asn	gtg Val 295	gac Asp	cag Gln	gac Asp	ctc Leu	gtc Val 300	ggc Gly	tgg Trp	caa Gln	gcg Ala	2713
ccc Pro 305	ccc Pro	ggg Gly	gcg Ala	cgt Arg	tcc Ser 310	ttg Leu	aca Thr	cca Pro	tgc Cys	acc Thr 315	tgc Cys	ggc Gly	agc Ser	tcg Ser	gac Asp 320	2761
ctt Leu	tac Tyr	ttg Leu	gtc val	acg Thr 325	agg Arg	cat His	gcc Ala	gat Asp	gtc val 330	att Ile	ccg Pro	gtg val	cgc Arg	cgg Arg 335	cgg Arg	2809
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ggc Gly	atc Ile 370	ttt Phe	cgg Arg	gct Ala	gcc Ala	gtg Val 375	tgc Cys	acc Thr	cga Arg	ggg Gly	gtt Val 380	gcg Ala	aag Lys	gcg Ala	gtg Val	2953
gac Asp 385	ttt Phe	gta Val	ccc Pro	gtc val	gag Glu 390	tct Ser	atg Met	gga Gly	acc Thr	act Thr 395	atg Met	cgg Arg	tcc Ser	ccg Pro	gtc Val 400	3001
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gcc Ala	cat His	cta Leu	cac His 420	gcc Ala	cct Pro	act Thr	ggt Gly	agc Ser 425	ggc Gly	aag Lys	agc Ser	act Thr	aag Lys 430	gtg Val	ccg Pro	3097
gct Ala	gcg Ala	tat Tyr 435	gca Ala	gcc Ala	caa Gln	ggg Gly	tat Tyr 440	aag Lys	gtg Val	ctt Leu	gtc Val	ctg Leu 445	aac Asn	ccg Pro	tcc Ser	3145
gtc Val	gcc Ala 450	gcc Ala	acc Thr	cta Leu	ggt Gly	ttc Phe 455	ggg Gly	gcg Ala	tat Tyr	atg Met	tct Ser 460	aag Lys	gca Ala	cat His	ggt Gly	3193
atc Ile 465	gac Asp	cct Pro	aac Asn	atc Ile	aga Arg 470	acc Thr	ggg Gly	gta Val	agg Arg	acc Thr 475	atc Ile	acc Thr	acg Thr	ggt Gly	gcc Ala 480	3241
ccc Pro	atc Ile	acg Thr	tac Tyr	tcc Ser 485	acc Thr	tat Tyr	ggc Gly	aag Lys	ttt Phe 490	ctt Leu	gcc Ala	gac Asp	ggt Gly	ggt Gly 495	tgc Cys	3289
tct Ser	ggg Gly	ggc Gly	gcc Ala 500	tat Tyr	gac Asp	atc Ile	ata Ile	ata Ile 505	tgt Cys	gat Asp	gag Glu	tgc Cys	cac His 510	tca Ser	act Thr	3337

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acg (gct Ala 530	gga Gly	gcg Ala	cga Arg	ctc Leu	gtc Val 535	gtg Val	ctc Leu	gcc Ala	acc Thr	gct Ala 540	acg Thr	cct Pro	ccg Pro	gga Gly	3433
tcg Ser 545	gtc Val	acc Thr	gtg Val	cca Pro	cat His 550	cca Pro	aac Asn	atc Ile	gag Glu	gag Glu 555	gtg Val	gct Ala	ctg Leu	tcc Ser	agc Ser 560	3481
act (gga Gly	gaa Glu	atc Ile	ccc Pro 565	ttt Phe	tat Tyr	ggc Gly	aaa Lys	gcc Ala 570	atc Ile	ccc Pro	atc Ile	gag Glu	acc Thr 575	atc Ile	3529
aag (Lys (ggg Gly	ggg Gly	agg Arg 580	cac His	ctc Leu	att Ile	ttc Phe	tgc Cys 585	саt His	tcc Ser	aag Lys	aag Lys	aaa Lys 590	tgt Cys	gat Asp	3577
gag (Glu	ctc Leu	gcc Ala 595	gcg Ala	aag Lys	ctg Leu	tcc Ser	ggc Gly 600	ctc Leu	gga Gly	ctc Leu	aat Asn	gct Ala 605	gta Val	gca Ala	tat Tyr	3625
tac (cgg Arg 610	ggc Gly	ctt Leu	gat Asp	gta Val	tcc Ser 615	gtc val	ata Ile	cca Pro	act Thr	agc Ser 620	gga Gly	gac Asp	gtc Val	att Ile	3673
gtc Val 625	gta Val	gca Ala	acg Thr	gac Asp	gct Ala 630	cta Leu	atg Met	acg Thr	ggc Gly	ttt Phe 635	acc Thr	ggc Gly	gat Asp	ttc Phe	gac Asp 640	3721
tca (Ser)	gtg Val	atc Ile	gac Asp	tgc Cys 645	aat Asn	aca Thr	tgt Cys	gtc Val	acc Thr 650	cag Gln	aca Thr	gtc Val	gac Asp	ttc Phe 655	agc Ser	3769
ctg (gac Asp	ccg Pro	acc Thr 660	ttc Phe	acc Thr	att Ile	gag Glu	acg Thr 665	acg Thr	acc Thr	gtg Val	cca Pro	caa Gln 670	gac Asp	gcg Ala	3817
gtg Val	tca Ser	cgc Arg 675	tcg Ser	cag Gln	cgg Arg	cga Arg	ggc Gly 680	agg Arg	act Thr	ggt Gly	agg Arg	ggc Gly 685	agg Arg	atg Met	ggc Gly	3865
att i	tac Tyr 690	agg Arg	ttt Phe	gtg val	act Thr	cca Pro 695	gga Gly	gaa Glu	cgg Arg	ccc Pro	tcg Ser 700	ggc Gly	atg Met	ttc Phe	gat Asp	3913
tcc Ser : 705	tcg Ser	gtt Val	ctg Leu	tgc Cys	gag Glu 710	tgc Cys	tat Tyr	gac Asp	gcg Ala	ggc Gly 715	tgt Cys	gct Ala	tgg Trp	tac Tyr	gag Glu 720	3961
ctc a	acg Thr	ccc Pro	gcc Ala	gag Glu 725	acc Thr	tca Ser	gtt Val	agg Arg	ttg Leu 730	cgg Arg	gct Ala	tac Tyr	cta Leu	aac Asn 735	aca Thr	4009
cca (Pro (ggg Gly	ttg Leu	ccc Pro 740	gtc val	tgc Cys	cag Gln	gac Asp	cat His 745	ctg Leu	gag Glu	ttc Phe	tgg Trp	gag Glu 750	agc Ser	gtc Val	4057
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cag Gln	gca Ala 770	gga Gly	gac Asp	aac Asn	ttc Phe	ccc Pro 775	tac Tyr	ctg Leu	gta Val	gca Ala	tac Tyr 780	cag Gln	gct Ala	acg Thr	gtg Val	4153
tgc Cys 785	gcc Ala	agg Arg	gct Ala	cag Gln	gct Ala 790	cca Pro	cct Pro	cca Pro	tcg Ser	tgg Trp 795	gac Asp	caa Gln	atg Met	tgg Trp	aag Lys 800	4201
tgt Cys	ctc Leu	ata Ile	cgg Arg	cta Leu 805	aag Lys	cct Pro	acg Thr	ctg Leu	cac His 810	ggg Gly	cca Pro	acg Thr	ccc Pro	ctg Leu 815	ctg Leu	4249
tat Tyr	agg Arg	ctg Leu	gga Gly 820	gcc Ala	gtt val	caa Gln	aac Asn	gag Glu 825	gtt Val	act Thr	acc Thr	aca Thr	cac His 830	ccc Pro	ata Ile	4297
acc Thr	aaa Lys	tac Tyr 835	atc Ile	atg Met	gca Ala	tgc Cys	atg Met 840	tcg Ser	gct Ala	gac Asp	ctg Leu	gag Glu 845	gtc Val	gtc Val	acg Thr	4345
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tgc Cys 865	ctg Leu	aca Thr	aca Thr	ggc Gly	agc Ser 870	gtg Val	gtc Val	att Ile	gtg val	ggc Gly 875	agg Arg	atc Ile	atc Ile	ttg Leu	tcc Ser 880	4441
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gat Asp	gag Glu	atg Met	gaa Glu 900	gag Glu	tgc Cys	gcc Ala	tca Ser	cac His 905	ctc Leu	cct Pro	tac Tyr	atc Ile	gaa Glu 910	cag Gln	gga Gly	4537
atg Met	cag Gln	ctc Leu 915	gcc Ala	gaa Glu	caa Gln	ttc Phe	aaa Lys 920	cag Gln	aag Lys	gca Ala	atc Ile	ggg Gly 925	ttg Leu	ctg Leu	caa Gln	4585
aca Thr	gcc Ala 930	acc Thr	aag Lys	caa Gln	gcg Ala	gag Glu 935	gct Ala	gct Ala	gct Ala	ccc Pro	gtg Val 940	gtg Val	gaa Glu	tcc Ser	aag Lys	4633
tgg Trp 945	cgg Arg	acc Thr	ctc Leu	gaa Glu	gcc Ala 950	ttc Phe	tgg Trp	gcg Ala	aag Lys	cat His 955	atg Met	tgg Trp	aat Asn	ttc Phe	atc Ile 960	4681
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gcg Ala	ata Ile	gca Ala	tca Ser 980	ctg Leu	atg Met	gca Ala	ttc Phe	aca Thr 985	gcc Ala	tct Ser	atc Ile	acc Thr	agc Ser 990	ccg Pro	ctc Leu	4777
acc Thr	acc Thr	caa Gln 99	His	acc Thr	ctc Leu	ctg Leu	ttt Phe 1000	Asn	atc Ile	ctg Leu	ggg Gly	gga Gly 100	Trp	gtg Val	gcc Ala	4825
gcc Ala	caa Gln 1010	Leu	gct Ala	cct Pro	ccc Pro	agc Ser 101	Ala	gct Ala	tct Ser	gct Ala	ttc Phe 1020	val	ggc Gly	gcc Ala	ggc Gly	4873

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gat att ttg gca ggt tat gga gca ggg gtg gca ggc gcg ctc gtg gcc 496 Asp Ile Leu Ala Gly Tyr Gly Ala Gly Val Ala Gly Ala Leu Val Ala 1045 1050 1055	9
ttt aag gtc atg agc ggc gag atg ccc tcc acc gag gac ctg gtt aac 501 Phe Lys Val Met Ser Gly Glu Met Pro Ser Thr Glu Asp Leu Val Asn 1060 1065 1070	.7
cta ctc cct gct atc ctc tcc cct ggc gcc cta gtc gtc ggg gtc gtg 506 Leu Leu Pro Ala Ile Leu Ser Pro Gly Ala Leu Val Val Gly Val Val 1075 1080 1085	55
tgc gca gcg ata ctg cgt cgg cac gtg ggc cca ggg gag ggg gct gtg 511 Cys Ala Ala Ile Leu Arg Arg His Val Gly Pro Gly Glu Gly Ala Val 1090 1095 1100	.3
cag tgg atg aac cgg ctg ata gcg ttc gct tcg cgg ggt aac cac gtc 516 Gln Trp Met Asn Arg Leu Ile Ala Phe Ala Ser Arg Gly Asn His Val 1105 1110 1115 1120	51
tcc ccc acg cac tat gtg cct gag agc gac gct gca gca cgt gtc act 520 Ser Pro Thr His Tyr Val Pro Glu Ser Asp Ala Ala Ala Arg Val Thr 1125 1130 1135	19
cag atc ctc tct agt ctt acc atc act cag ctg ctg aag agg ctt cac 525 Gln Ile Leu Ser Ser Leu Thr Ile Thr Gln Leu Leu Lys Arg Leu His 1140 1145 1150	7
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cgt tcc atg agg atc gtg ggg cct agg acc tgt agt aac acg tgg cat 554 Arg Ser Met Arg Ile Val Gly Pro Arg Thr Cys Ser Asn Thr Trp His 1235 1240 1245	5
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tac ctg gtt ggg tca cag ctc cca tgc gag ccc gaa ccg gac gta gca 57 Tyr Leu Val Gly Ser Gln Leu Pro Cys Glu Pro Glu Pro Asp Val Ala 1345 1350 1355 1360	881
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agg gaa gta tcc gtt ccg gcg gag atc ctg cgg agg tcc agg aaa ttc 6. Arg Glu Val Ser Val Pro Ala Glu Ile Leu Arg Arg Ser Arg Lys Phe 1460 1465 1470	5217
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Leu Glu Lys Ala Leu Asp Cys Gln Ile Tyr Gly Ala Cys Tyr Ser Ile 2050 2055 2060	
gag cca ctt gac cta cct cag atc att caa cga ctc cac ggc ctt agc 8041 Glu Pro Leu Asp Leu Pro Gln Ile Ile Gln Arg Leu His Gly Leu Ser 2065 2070 2075 2080	•
gca ttt tca ctc cat agt tac tct cca ggt gag atc aat agg gtg gct 8089 Ala Phe Ser Leu His Ser Tyr Ser Pro Gly Glu Ile Asn Arg Val Ala 2085 2090 2095)
tca tgc ctc agg aaa ctt ggg gta ccg ccc ttg cga gtc tgg aga cat Ser Cys Leu Arg Lys Leu Gly Val Pro Pro Leu Arg Val Trp Arg His 2100 2105 2110	,
cgg gcc aga agt gtc cgc gct agg cta ctg tcc cag ggg ggg agg gct 8185 Arg Ala Arg Ser Val Arg Ala Arg Leu Leu Ser Gln Gly Gly Arg Ala 2115 2120 2125	;
gcc act tgt ggc aag tac ctc ttc aac tgg gca gta agg acc aag ctc Ala Thr Cys Gly Lys Tyr Leu Phe Asn Trp Ala Val Arg Thr Lys Leu 2130 2135 2140	i
aaa ctc act cca atc ccg gct gcg tcc cag ttg gat tta tcc agc tgg Lys Leu Thr Pro Ile Pro Ala Ala Ser Gln Leu Asp Leu Ser Ser Trp 2145 2150 2155 2160	•
ttc gtt gct ggt tac agc ggg gga gac ata tat cac agc ctg tct cgt Phe Val Ala Gly Tyr Ser Gly Gly Asp Ile Tyr His Ser Leu Ser Arg 2165 2170 2175)
gcc cga ccc cgc tgg ttc atg tgg tgc cta ctc cta ctt tct gta ggg 8377 Ala Arg Pro Arg Trp Phe Met Trp Cys Leu Leu Leu Ser Val Gly 2180 2185 2190	,
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Leu Glu Lys Ala Leu	Asp Cys Gln Ile T	yr Gly Ala Cys Tyr Ser Ile	
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Ser Cys Leu Arg Lys	Leu Gly Val Pro P	ro Leu Arg Val Trp Arg His	
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tcg gtc Ser Val 545	acc gtg Thr Val	cca ca Pro Hi 55	s Pro	aac Asn	atc Ile	gag Glu	gag Glu 555	gtg Val	gct Ala	ctg Leu	tcc Ser	agc Ser 560	3481
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